

LAWRENCE LIVERMORE REPORT

A weekly collection of scientific and technological achievements from Lawrence Livermore National Laboratory, Oct. 4-Oct. 8, 2010

MagNIFicent shot



The target is mounted in the cryogenic target positioning device. The two copper-colored arms form a shroud around the cold target to protect it until they open five seconds before a shot.

A NIF National Ignition Facility recently completed its first integrated ignition experiment, an important step in the road to fusion.

In the test, the 192-beam laser system fired 1 megajoule of laser energy into its first cryogenically layered capsule, raising the drive energy by a factor of 30 over experiments previously conducted at the Omega laser at the University of Rochester. With the completion of this test, NIF is beginning its next phase of the campaign to culminate in fusion ignition tests.

NIF, the world's largest and highest-energy laser system, is expected to be the first laser system to demonstrate reliable fusion ignition -- the same force that powers the sun and the stars -- in a laboratory environment. When NIF's lasers fire, more than one million joules of ultraviolet energy are focused into a pencil-eraser-sized gold cylinder that contains a peppercorn-sized plastic capsule filled with the hydrogen fuel.

"From both a system integration and from a physics point of view, this experiment was outstanding," said Ed Moses, director of the National Ignition Facility. "This is a great moment in the 50-year history of inertial confinement fusion."

To read more, go to the [Web](#).

Like mother, like daughter



A photomicrograph of *Bacillus anthracis* bacteria using Gram-stain technique.

A common pool chemical could be an effective decontaminant for water supplies tainted with anthrax, according to new research by a Laboratory counterterrorism expert and her high school-age daughter.

Ellen Raber, deputy program director for counterterrorism at the Laboratory, and her daughter, Alison Burklund, a student at the Athenian School in Danville, tested five chemical candidates to find the one most effective at wiping out *Bacillus anthracis* spores in a large public water system without posing health risks or damaging the environment.

The U.S. National Response Team, a federal organization that responds to hazardous substance incidents, has classified anthrax as a "probable" water threat.

According to research, which appears in the October issue of *Applied and Environmental Microbiology*, anthrax spores can survive for over a year in both pond and distilled water, and can resist heat, UV light and harsh disinfectants.

To read more, go to the [Web](#).

An eye on vision



Technician Terri Delima inspects an array.

An artificial retina that transforms a camera feed into electric pulses that stimulate the optic nerve, can provide rudimentary vision for millions of people with degenerative retinal diseases.

The Argus II implant, which Livermore helped developed with its 60 electrodes, is the second generation of the device; the first had only 16 electrodes. Information gleaned from the new clinical trial will be used to improve the 60-electrode version, which will be commercialized, first in Europe, as early as December.

But even as the trial continues, a much larger effort, involving six national labs, four universities and a

commercial partner, Second Sight Medical Products, is developing technologies that will enable third- and fourth-generation models using as many as 1,024 electrodes -- which could provide enough detail to read 24-point font and recognize faces. There are 100,000 people in the United States with retinitis pigmentosa and 10 million with degenerative retinal diseases.

To read more, go to the [Web](#).

Lab goes green for buildings



A schematic rendering of some of the details of the "Energy Innovation Hub" to be up and running at the Navy Yard in Philadelphia.

The Laboratory's expertise in integrated multi-physics modeling will be an integral part of a new national effort in energy efficient building research.

The goal of the Greater Philadelphia Innovation Cluster for Energy Efficiency Buildings (GPIC) is to establish The Navy Yard in Philadelphia and the surrounding area as the national center for energy efficient buildings research, education, policy and commercialization.

The new center will be led by Penn State University in partnership with LLNL and numerous other public, private and academic partners. The Department of Energy's \$122 million in funding will cover the core research and development activities of the Energy Efficiency Hub.

One of the goals of the research is to develop integrated end-to-end code for simulating building fluid/thermal flows; LLNL is lending a hand to this effort.

To read more, go to the [Web](#).

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LLNL applies and advances science and technology to help ensure national security and global stability. Through multi-disciplinary research and development, with particular expertise in high-energy-density physics, laser science, high-performance computing and science/engineering at the nanometer/subpicosecond scale, LLNL innovations improve security, meet energy and environmental needs and strengthen U.S. economic competitiveness. The Laboratory also partners with other research institutions, universities and industry to bring the full weight of the nation's science and technology community to bear on solving problems of national importance.

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